2000 AND BEYOND
General Aviation's Future:
The Past Continued, or Something New?

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Thanks, Pete, and good afternoon ladies and gentlemen. I appreciate the opportunity to be here this afternoon to underscore some of the exciting technology revolution that is ongoing and some elements that relate to the future of general aviation concerning the human resources that are necessary to take us into future decades.

Historians and educators have evaluated the 100 most significant events of the 20th century. Interestingly, two of them relate to aviation and aerospace. Number 2 was Neil Armstrong's first step on the moon, and #4 the Wright Brothers flight at Kitty Hawk. As we are only a few short years away from the 100th anniversary of that first powered flight at Kitty Hawk, the focus of the nation will be on aviation. The opportunity for us to take general aviation into the 21st century, aggressively, is in our hands. Indeed, the need for "leadership" will be greater than ever.

Before we describe the importance of the leadership necessary to go into the future, perhaps it would be valuable for us to have a quick review of our past. Otherwise, we will be destined to "coast" into the future on the basis of all the same paradigms that have brought us to where we are today.

How can we summarize 97 years of human, social, and technological change in three minutes? Let's give it a try. Of the things that have moved us forward – certainly the military – is at the top of the list. These are the requirements that have driven the technological development, the innovation, the human resources with trained personnel such as pilots, mechanics, engineers and support staff, that have been very influential in creating the aviation system, including the general aviation system, that we know today. War, specifically, drove even faster the need for aircraft development and the infrastructure, including airports, that we utilize today, as well as a significant increase in personnel. And lastly, public transportation needs have dictated a desire for a growing number of people to travel economically between major population areas. This also created, originally the rudimentary, and finally our current day air traffic control system.

So what has held us back? First the military. The very "military" that moved us forward started a dependency that, when eliminated in more recent years, left a vacuum in the aviation system capacity without a supply line of pilots, aircraft, and therefore general aviation utility.

In many ways, general aviation has not adapted well to social change. The evolution of the role of the family, the role of women in the workplace as well as in the family

structure, and many other social elements of personal transportation and recreation have changed significantly. I would suggest that general aviation has not adapted well to the changes of our society.

The layers of regulation on general aviation, that, in many cases, have been laid one upon another without a regular "global" view of regulatory needs and the impact they have on general aviation development is the next "hold-back." And, lastly – and not insignificantly, the change of FAA's charter in recent years eliminating the agency's responsibility along with the rest of the aviation community in "promotion of aviation development" has been a negative.

Today, I would like to hypothesize that the largest thing that has held us back in the first 97 years is a lack of understanding that general aviation development is about people. It is not about aircraft. It never has been. While we center most of our attention on technological development; for example we count aircraft, production numbers, aircraft movements, I would suggest that this has been all wrong. To make this point I would like to divert for a brief aviation history lesson -- a hypothesis of where we are today, and why. Why it is about people. Why it is about pilot population, not aircraft population.

Since the late 70's, we have seen student starts in virtually a free fall, an equally dramatic with a downward slide in light plane production, a six-figure decrease in total pilot population, the closure of both public and private airports, FBOs and other airport businesses. A lot of the rationales have been put forth to explain this unprecedented decline -- the worst of its kind in aviation history. Product liability and runaway aircraft price escalation top most lists. But business is not really been the fundamental problem.

We have had several declines in light plane production over the first 97 years. After a build-up (relatively speaking) in the 1920s, there were declines in the late '20s following Lindbergh's flight to Paris and the Great Depression. After 35,000 light planes were produced in 1946, flooding a grossly overestimated post-World War II market, there was a nosedive in sales in 1947 and 1948. Key, however, was the fact that there was not an accompanying huge and continuing decline in student starts or the total pilot population in either of these aircraft production declines. Our current decline is really a pilot-based, rather than a manufacturing-based decline. All of the other associated woes, including those of light plane manufacturers, have descended upon us largely because there are fewer and fewer people coming to the airport to learn to fly and to rent planes and to buy planes.

While this disappearance of pilots and prospective pilots at airports may seem mysterious, it really is not. The onset of the phenomenon simply coincided with the end of the chain of great economic programs and the beginning of a natural life cycle. Beginning in 1939, the United States government provided virtually free flight training for approximately the next 40 years, until the late 1970s. The Civil Pilot Training Program, the War Training Service after Pearl Harbor trained an amazing 435,165 pilots between 1939 and 1944. The World War II GI Bill and its subsequent extension, the Korean War GI Bill continued this trend of providing free flight instruction and flight training for those

who only had to claim that they were interested in using it as "career development." But the money machine finally ran dry in the late 1970s. The effect of the CPT, the GI Bill and other training programs was enormous. They were responsible for the majority of flight training students for many years. They were responsible for general aviation's infrastructure being larger than it would have been without these programs. And, they were responsible for the sale of more airplanes, particularly trainers, than ever before.

Military pilots who earn their wings between 1939 and 1945, when they were in their 20s, were reaching their 60s in the 1980s. And they were beginning to hand up their goggles. Fundamentally, what we were seeing in the 1980s was our general aviation community seeking its natural level--shrinking back to the size it might have been had there never been a CPT/WTS and GI Bill.

I suggest it would have happened even if there had been no fuel crisis in the 1970s and early '80s and no culture shock over $2.00 per gallon avgas, even if there had been no elimination of accelerated depreciation…or even if there had been no huge escalation in product liability cases in the early '80s and consequent increases in product liability insurance premiums and aircraft prices.

There were other elements at play, nevertheless. Just think of the social change! In the 1980s, by the time prospective new pilots were typically "forty-something" and could see the end of the tunnel on their mortgages and their children's education, times and attitudes had changed dramatically. These were people who were in their 20's in the 1960s -- the era of the Cold War, the race to the moon, the Beatles, The Great Society, the Vietnam War, hippies, and the anti-war protests. For them, flying was no longer the highest aspiration a young person could have, as it had been in the 1930s; there was no patriotic memory of World War II and the dramatic air battles that were trumpeted every evening on the radio news.

Having come of age in an era when the very foundations of our political and social systems were challenged, they were far less tolerant than previous generations of the hassle factor imposed through militaristic regulation and enforcement by government agencies like the FAA. Economically, they had higher expectations for ownership of consumer goods and services…at a time when their real income, adjusted for inflation, was decreasing…so was competition for their disposable income. General aviation, which was complacently mired in the attitudes and technology of the 1940s, was simply not able to compete in the marketplace of the 1980s and beyond.
By the end of the 1980s, the top sellers in the personal airplane field were no longer the decades-old designs offered by the few lightplane manufacturers still in the business, but, rather, sleek homebuilts that were more attuned to the times.

Obviously, new attitudes and a new plan for the future were needed.

General aviation vehicle needs of the future are in three broad categories. Personal transportation: To augment the mass aviation transportation network that will provide for all-weather, safe, capable movement of individuals – regardless of purpose. Secondly, the transportation of goods, with appropriately sized vehicles as a supplement to the larger transport aviation system. And third, recreational air vehicles

for a wide variety of recreational purposes. Everything from parachutes and hang-gliders to exhibition jet aircraft to hot air balloons to recreational aerobatic aircraft to vintage production planes and everything in between. So what has led to this redefinition of general aviation? I would suggest that it includes social change, experimentation, computerization, identification of the need for FAA certification change as well as NASA's vision which has been played out on EAA's stage. I'd like to briefly explore each of these elements.

While NASA's AGATE, GAP and SATS programs are all working toward the clarification of the need for personal aviation transportation, a number of new-start companies are also recognizing the differing needs of the general aviation community with such innovations as the aircraft parachute recovery system that is now certified on the SR20 and the innovative flight and weather information systems and real-time computerized aircraft system diagnostics on other new aircraft.

The opportunity for women -- both in choosing aviation as a career path, as well as an individual and family decision-maker to participate in aviation as a recreation, or to use it as transportation, is an important part of the social change.

The role of the family needs to be carefully understood as it continues to change both the marketplace and the regulatory environment needs to adapt to the changing requirements of the "family" within the general aviation community.

And last, but certainly not least, there needs to be a clear recognition that aviation is an important recreational outlet. For many, aviation is a lifestyle that reinforces enthusiasm for all of aviation and its infrastructure. Face it, recreation is big business. And recreational aviation is an important part of the aviation community.

The second redefinition element is experimentation. The early development of composite homebuilts led to the discovery that laminar flow is more than just a lab test. It can be accomplished in the real world. These proof-of-concept planes – the Boomerang, the V-Jet, and the Proteus -- have demonstrated significant advances with new airframes, new materials, and new wing designs.

The next element has been the advances in computerization. Everyone knows about the leaps in computer technology and what it has meant to aircraft panels in the last decade: GPS, integrated CNS, FIS, weather-in-the-cockpit. Within the homebuilt movement, outside of FAA's lethargic certification process, many have used automotive industry technology and significant advancements in the PC industry to make giant leaps in the use of this technology in general aviation.

FAA's certification role and its redefinition have been important as well. Not just for those who have the time and interest to "build their own," the homebuilt movement has spawned a number of production aircraft as well. The work of EAA, FAA and SAMA in the early '90s resulted in the Small Airplane Certification and Compliance Program, leading to new thinking at FAA about simplifying procedures. However, a lot of work has yet to be done. The Quicksilver GT500, the Zenair CH2000, Cirrus Design SR20,

and the Lancair Columbia 300 all have evolved from the homebuilt movement through the FAA certification process and are now in production.

The last element of general aviation's redefinition has been the NASA "vision" being played out on the EAA AirVenture Oshkosh "stage." After years of darkness in general aviation research work, comes NASA with a series of collaborative programs which involve all elements of government and industry and insure ownership by the industry with cost-sharing initiatives. In 1992, NASA Administrator Dan Goldin made a landmark visit – his first -- to EAA AirVenture Oshkosh. The Administrator met with key innovators, kitplane manufacturers, and others that were utilizing the homebuilt movement's lack of restriction and our forward thinking to adjust to the marketplace and work towards the future. The Administrator's visit there took a whole new view of the importance of research for general aviation.

By 1994, the AGATE Program had been created and Dan Goldin returned to AirVenture announcing AGATE to explore and advance the role of general aviation and personal transportation. He also declared that the annual "report card" of progress towards these goals would be at the annual gathering at Oshkosh.

By 1997, the GAP Program was announced to develop new and affordable propulsion systems for general aviation. This was based on the acknowledgement that all major advancements in aeronautical technology have been keyed to advancements in propulsion systems. Williams International, which had pioneered development of small, highly efficient jet engines in the 1960s, was challenged by a NASA contract to develop an engine at $1/10^{th}$ of the typical cost. Teledyne Continental was also assigned to produce a two-stroke diesel engine at 1/2 of the cost for a comparably powered engine.

By 1999, the Administrator's visit to AirVenture was underscoring his recently announced Small Aircraft Transportation System. Administrator Goldin described the full picture of general aviation's future vision, bringing together aircraft capabilities, aircraft systems, propulsion advancements, and an infrastructure of air transportation system to include flight information systems, weather-in-the-cockpit, all fully integrated into a safe, personal air transportation system.

So what will we see in 2000? The visible results! In 1997, Dan Goldin made the challenge to deliver a sample of this new generation of technology to AirVenture 2000. And it will happen! For those of you that saw yesterday's news announcement, the Eclipse Aviation Company has announced it will display at AirVenture 2000, a six-place aircraft with the weight of a Beech Baron, the price tag of less than a Beech Bonanza and the operating characteristics of a jet. Come to Oshkosh this year and see the engine that Dan Goldin, Sam Williams, and Burt Rutan said you would be able to carry under one arm. Eighty-five pounds. 770 pounds of thrust. A huge weight-to-power ratio. The Eclipse 500 will come from what is described as "disruptive technology," virtually leaping into the future.

The Eclipse – and many other revolutionary ideas – has been "born under an airplane wing at Oshkosh." The homebuilt community is proud of its contributions to general

aviation's future. The homebuilt movement has created a market by expanding the performance of general aviation, personal transportation, and recreation.

As a result of the lack of restriction in the experimental amateur-built aircraft regulations, manufacturers of kit aircraft have been allowed to focus on customer service and rapid response to customer demands for performance. This regulatory freedom also enables opportunity for design innovation and the use of various construction techniques and materials. Homebuilts have incorporated product development both in aircraft, in aircraft systems, in avionics, and in the use of automotive technologies.

And certainly, not insignificantly, the excitement of design, construction options, and performance capability has created, and maintained, enthusiasm for general aviation.

All the efforts, not just homebuilding, to identify and respond to the changing requirements of general aviation should be encouraged and expanded. It is important for those of us in positions of responsibility in the general aviation community to "lead" into the future. It would appear that our assignments, while complimentary and overlapping, are somewhat distinct.

Government's job is to lead by evolving the certification and operational regulations. The aviation industry must carefully identify the needs of the marketplace, and respond – very importantly – quickly. Aviation associations have many roles, but one of the most significant is to promote. EAA, and its worldwide membership of volunteers, have now taken 567,769 young people for a meaningful flight experience as a part of our EAA Young Eagles Program. This is only one example of one organization's commitment to the future. There are certainly many others.

These Young Eagles will not all become pilots. Some will be future engineers, or a U.S. Senator, or an FAA Administrator, or a citizen voting on your local airport referendum. They will have to deal with whatever "future" we give them.

The enthusiasm for aviation's future is out there. The need for us to accomplish general aviation's vision is imperative. Let's lead our nation to that future vision

Thanks for the opportunity to be a part of today's program. I'll see you in July next to the Eclipse display on the AirVenture ramp.